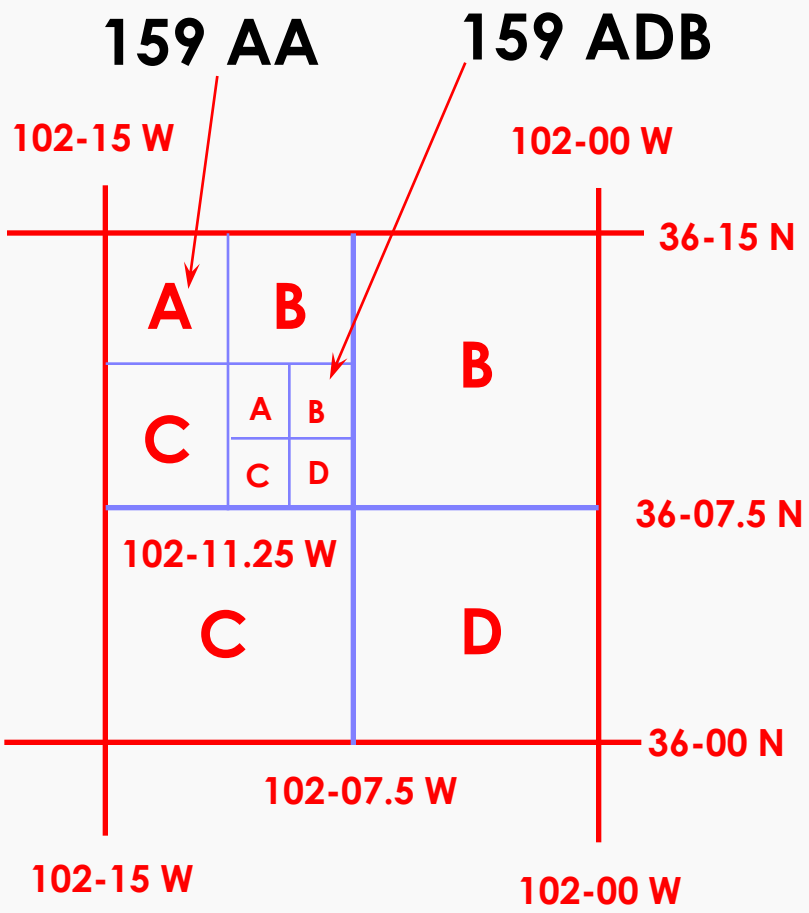
Visual Search Patterns and Procedures

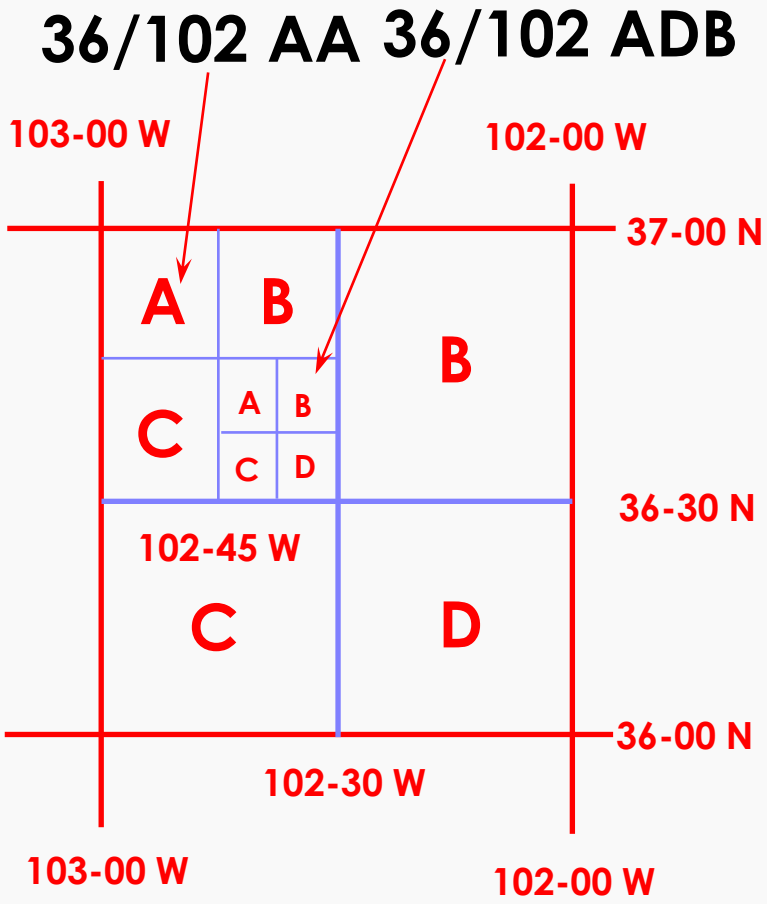
CAP Standard Grid System

- Overlays standard sectional maps
- Subdivides the map into distinct working areas
- Each grid is 1/4° (15 minutes) of latitude by 1/4° of longitude and is assigned a number
- Grids are further divided into sub-grids labeled A, B, C, and D
- Each sectional has a standard for assigning grid numbers — for areas of overlap the grid number of the most westerly chart is used
  - Each grid on the sectional is assigned a number
  - In this example, the grid depicted is numbered 159
  - Grids are subdivided into smaller sections
  - Letters are used to define sub-grids



Standardized Latitude & Longitude Grid System

- Can be used on any kind of chart that has lines of lat/long
- 1° blocks identified by the intersection of whole numbers of lat/long, such as 36-00N and 102-00W
- Points are designated with the latitude first (36 /102) and they identify the area north and west of the intersection of these two lines
- Grids can be subdivided into smaller sections
- Letters are used to define sub-grids
- Lat-long of lower right corner defines the grid (latitude first



TIME TO CROSS A QUARTER GRID (MINUTES)

Groundspeed (Knots)	70	80	90	100	110	120
Lenthwise	6:35	5:40	5:00	4:30	4:05	3:45
Crosswise	5:10	4:30	4:00	3:35	3:15	3:00

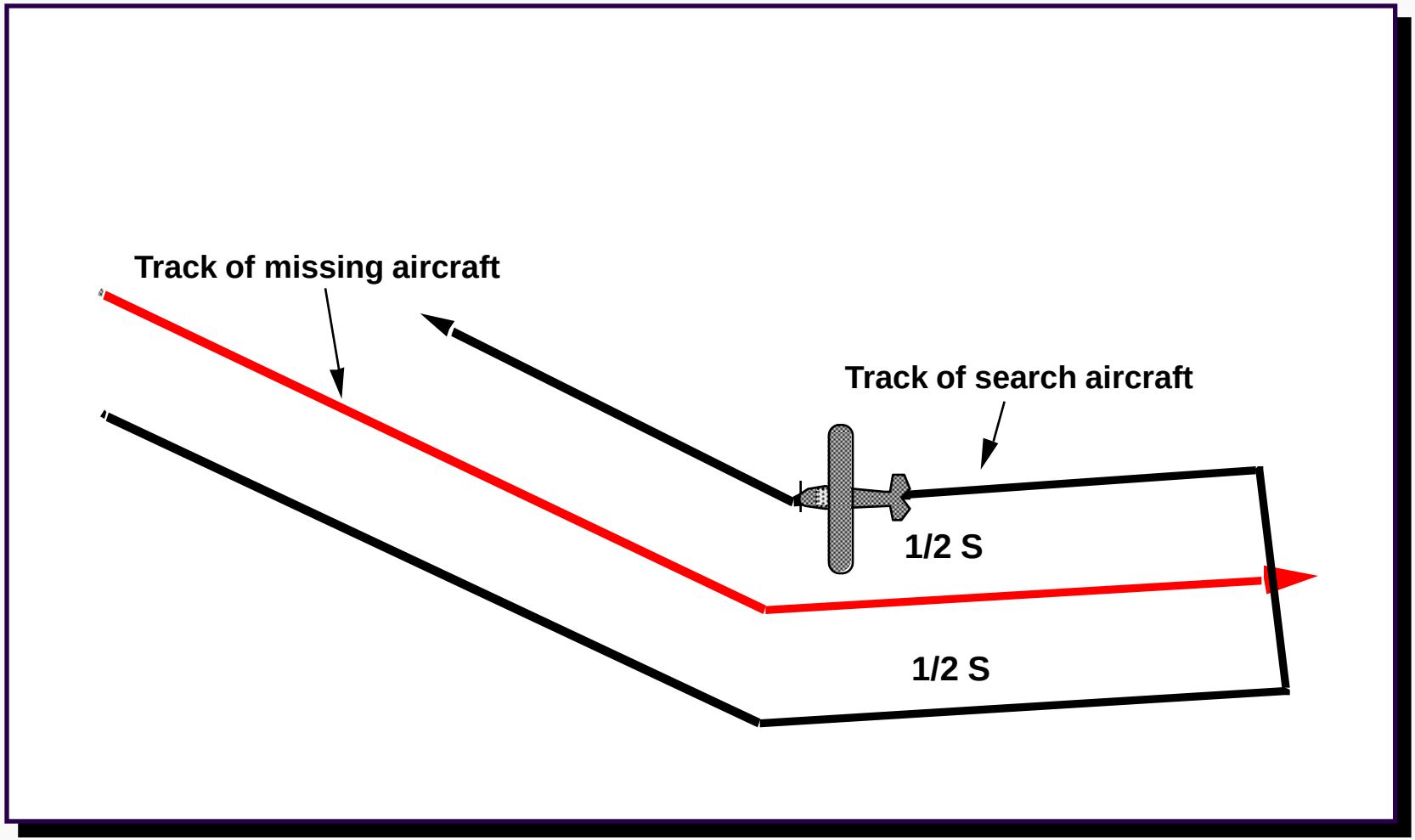
ANGLE OF BANK TO COMPLETE A 180 TRACK SPACING TURN

Track Spacing	.5 NM			1 NM			1.5 NM		
TAS	80	90	100	80	90	100	80	90	100
Crosswind									
-20	5	8	12	2	4	6	1.5	3	4
-10	13	17	22	6	9	11	4	6	8
0	20	25	30	11	13	16	7	9	11
10	28	33	37	15	18	21	10	14	18
20	34	39	43	18	22	25	13	15	18

Latitude, Longitude and Distance (and the GPS)

- **One minute latitude = 1.0018 nm**
  - **Fly one minute north or south, cover one nautical mile (a 1-nm leg width)**
- **One minute longitude = anywhere from 0.6572 to 0.9152 nm in the continental U.S.**
  - **Means you'll have to fly anywhere from 1.1 – 1.4 minutes of longitude (east or west) to cover one nautical mile**
  - **Not hard to do, but for training we will use one minute = one mile, even though we'll be flying less than 1-nm leg widths**
  - **To get the relationship in your area, go http://jan.ucc.nau.edu/~cvm/latlongdist.php**

Route Search Pattern



Assume we're searching for an aircraft along Highway 46, between Columbus and Greensburg:

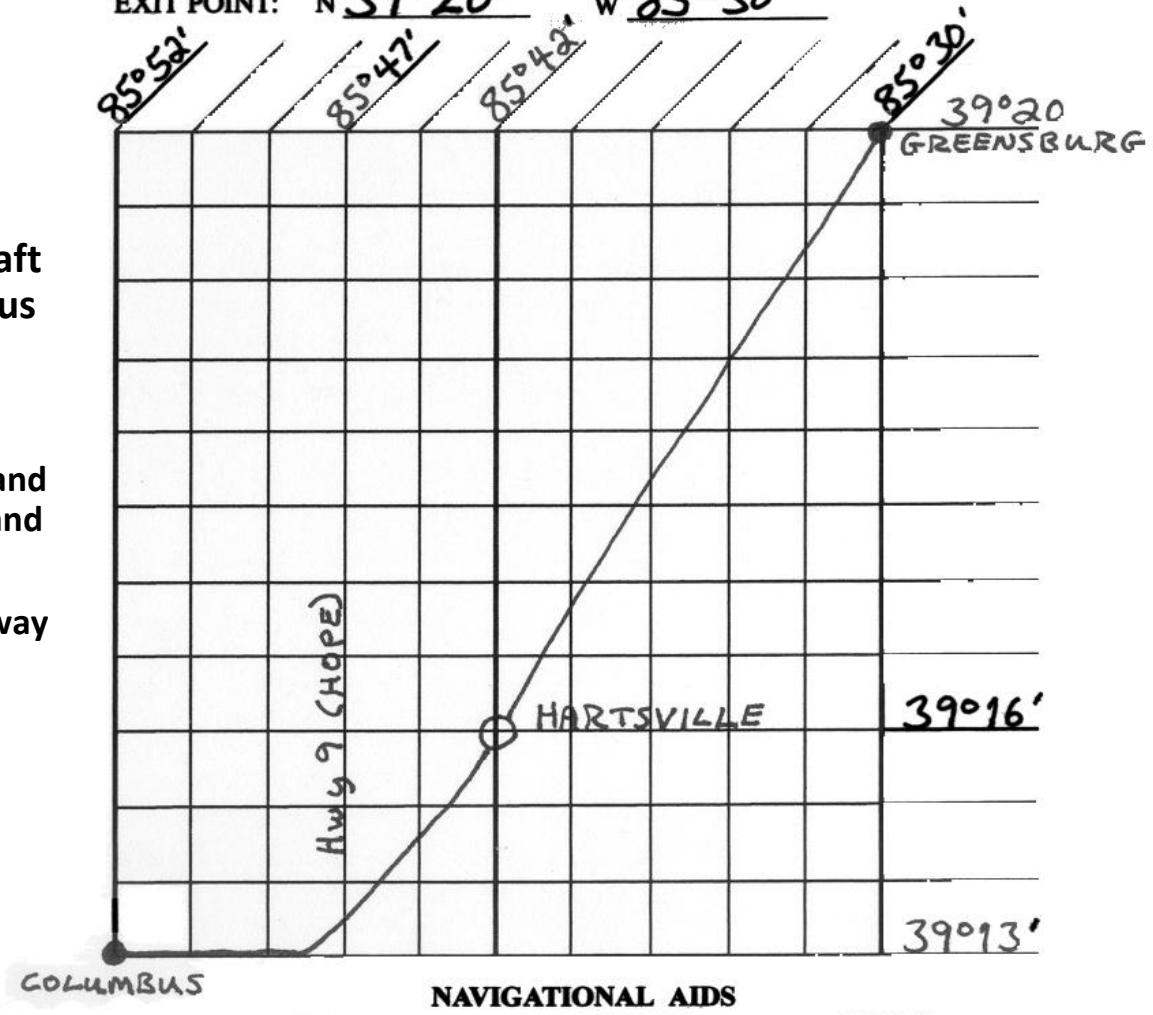
- **Draw the route on the worksheet**
- **Include significant turns in the highway and other identifiers such as towns, airports and major intersections**
- **Search two miles either side of the highway**

Route Search

SECTIONAL: STL (N) S GRID #

ENTRY POINT: N 39°13' W 85°52'

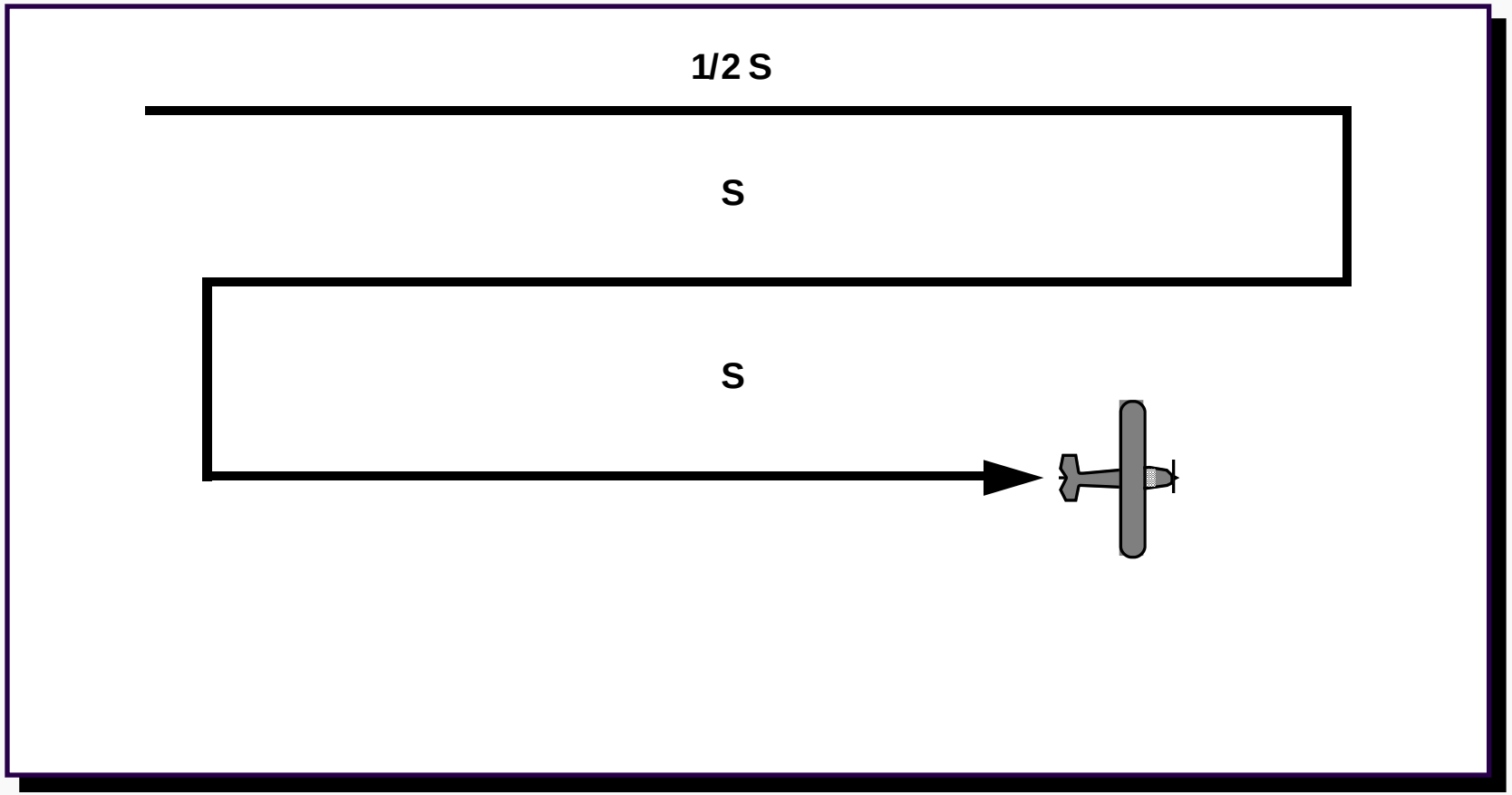
EXIT POINT: N 39°20' W 85°30'



NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	SHB	112.0	183° (Columbus)
2.	"	"	163° (Hartsville)
3.	"	"	139° (Greensburg)

Parallel Track search pattern



Grid Coordinates

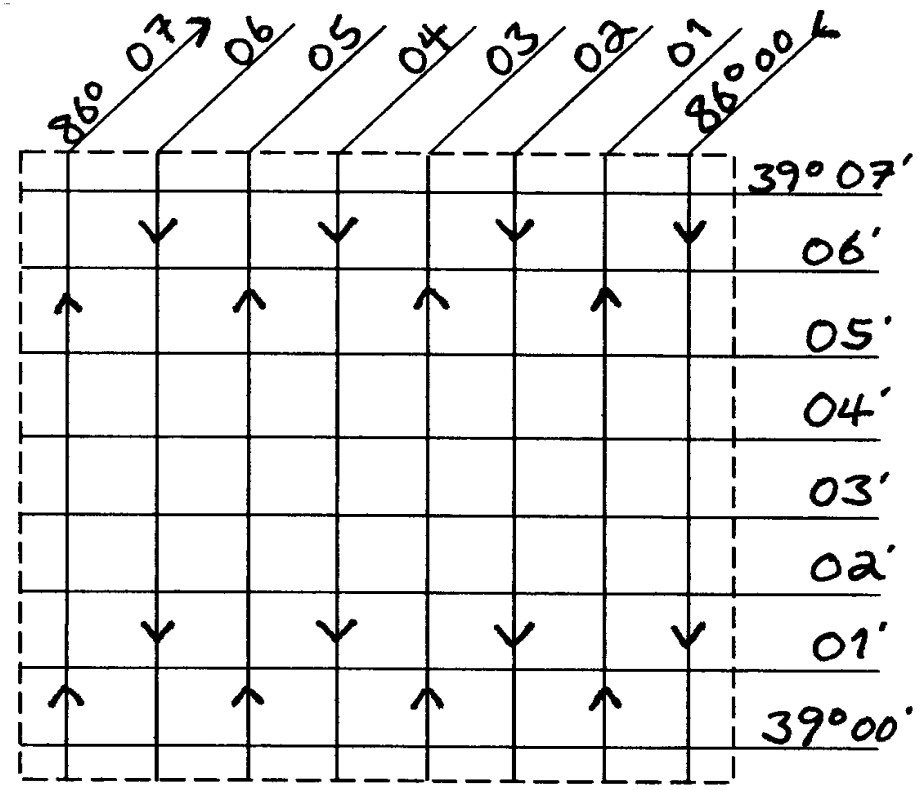
SECTIONAL: STL (N) S GRID # 104 A B C (D)

ENTRY POINT: N 39°07.5′ W 86°00′

EXIT POINT: N 39°07.5′ W 86°07′

Assume we're searching STL #104-D for a missing aircraft:

- Quarter-grid, 7.5' x 7.5'
- Enter the northeast corner
- One nm track spacing
- North/South legs
- No aircraft assigned to adjacent grids



- **GX55 Data**
- **Type Grid & Sectional:** US , STL
- **Pattern:** Parallel Line
- **Grid:** 104D2
- **Spacing:** 1 nm
- **Direction of Travel:** N/S

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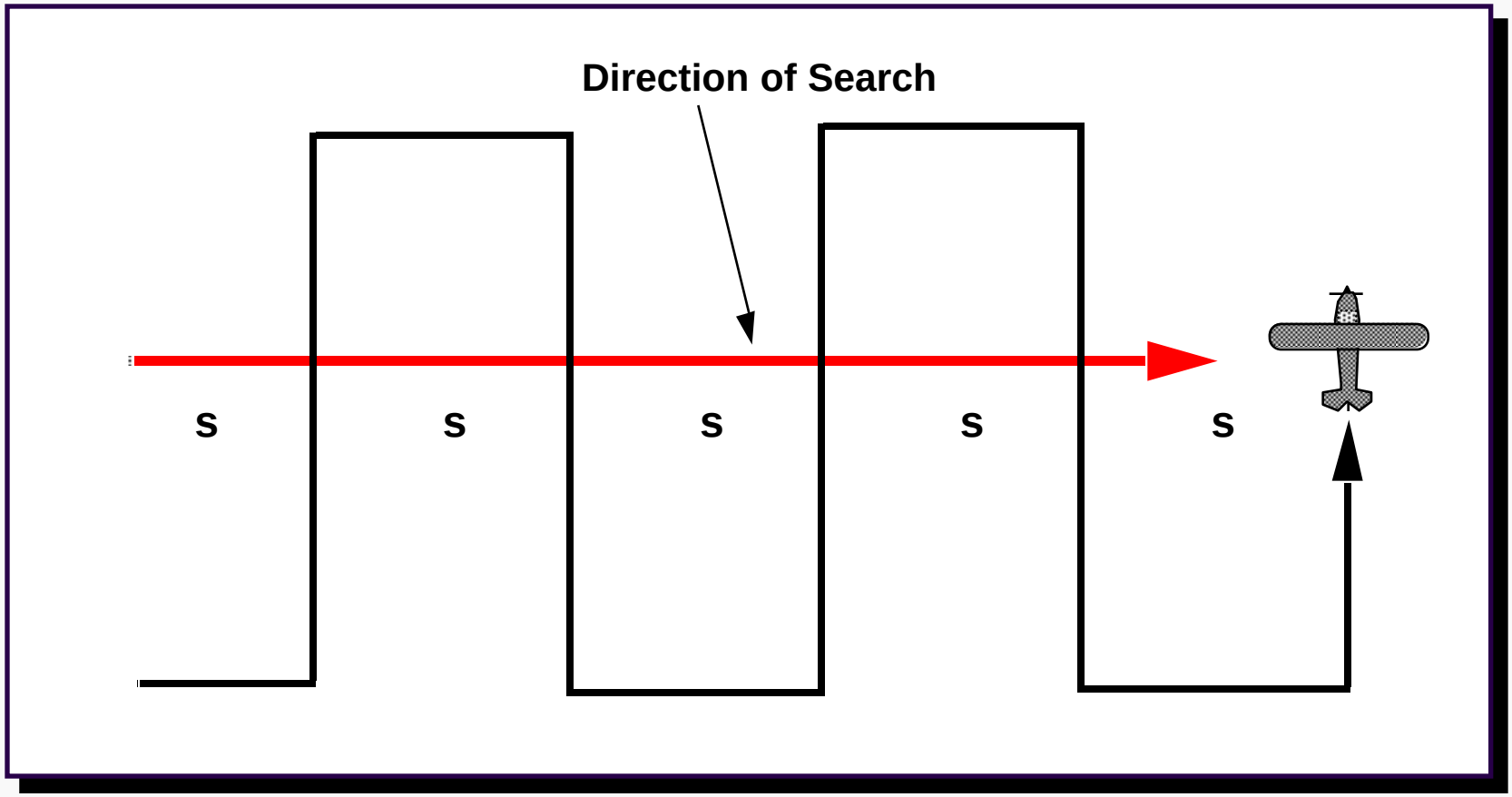
	IDENTIFIER	FREQUENCY	RADIAL
1.	OOM	110.2	090°
2.	ABB	112.4	330°

Creeping Line Search Pattern



Searching for an aircraft along Highway 31:

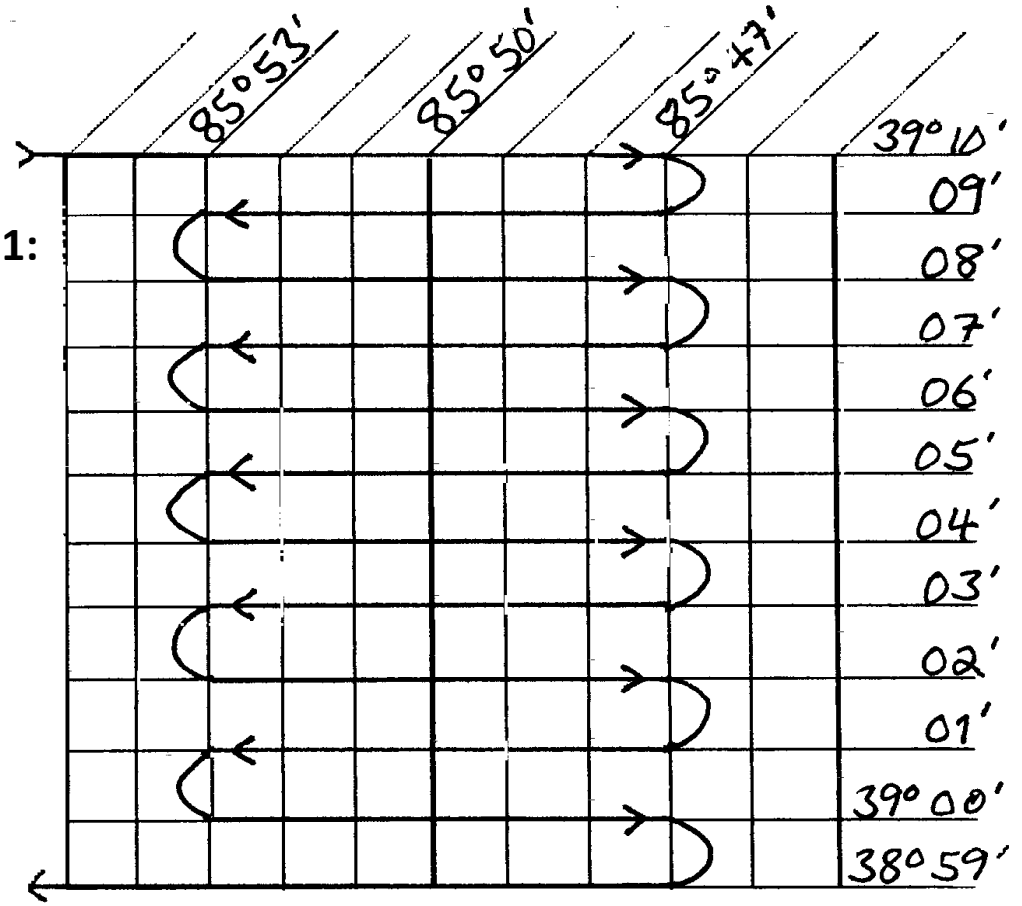
- Draw the route on the worksheet
- Start at the intersection of Hwys 31/9 (southeast of Columbus)
- Stop at the intersection of Hwys 31/50 (east of Seymour)
- Search three miles either side of Hwy 31
- 1-nm track spacing

Creeping Line Coordinates

SECTIONAL: STL (N) S GRID # _____ A B C D

ENTRY POINT: N 39° 10' W 85° 53'

EXIT POINT: N 38° 59' W 85° 53'



NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
	OOM	110.2	090°
2.	SHB	112.0	181°
3.	OOM	110.2	097°

Creeping Line Search (CDI) Example

Assume we're searching for an aircraft along the extended runway centerline of BMG runway 06:

- Draw the route on the worksheet
- Search 10 nm beyond the end of runway 06 (southwest)
- Search three miles either side of the extended centerline
- 1-nm track spacing

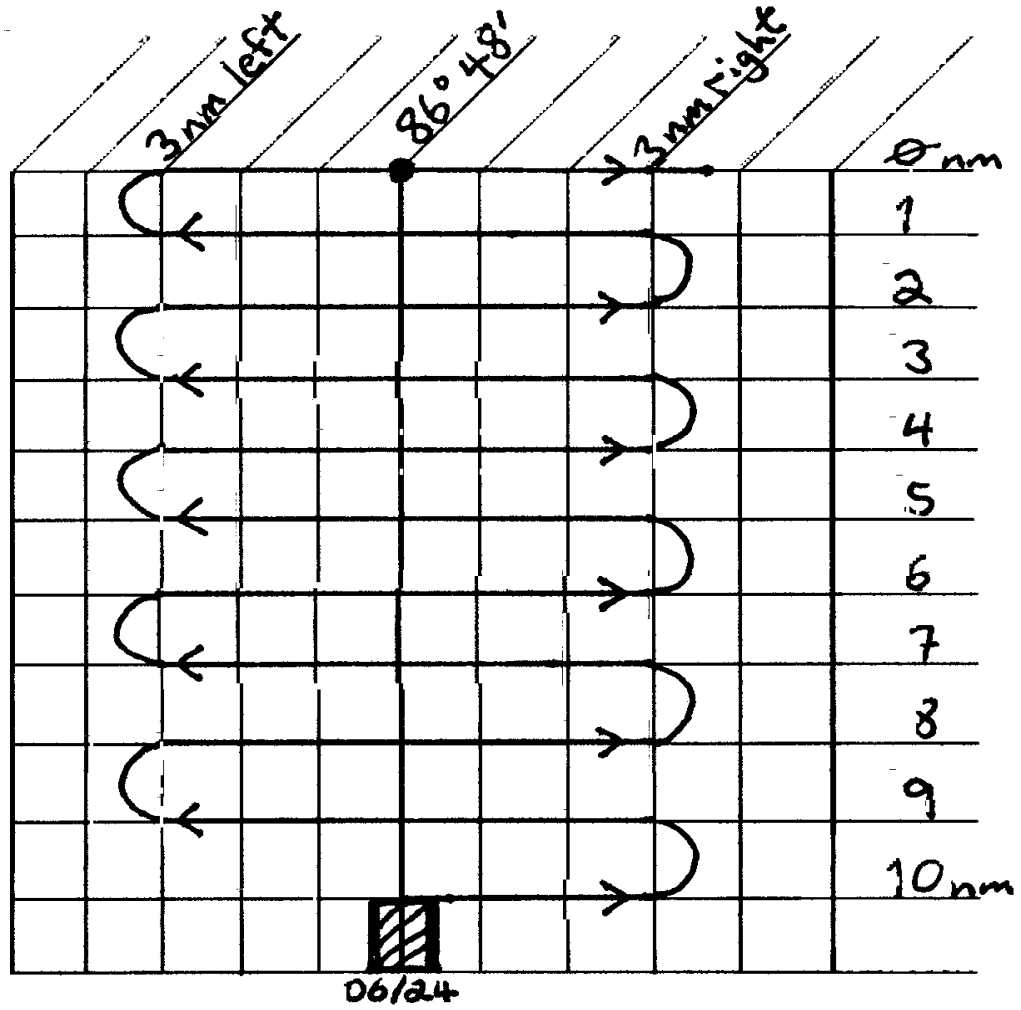
- **GX55 Data**
- Type Grid & Sectional: US , STL
- Pattern: Creeping Line
- Starting Waypoint: BMG
- Spacing: 1 nm
- Direction of Travel: 060°
- Leg Length: 3 nm
- Start Side: Right

Creeping Line Coordinates

SECTIONAL: STL (N) S GRID # _____ A B C D

ENTRY POINT: N BMG W 06/24

EXIT POINT: N 39°03' W 86°48'



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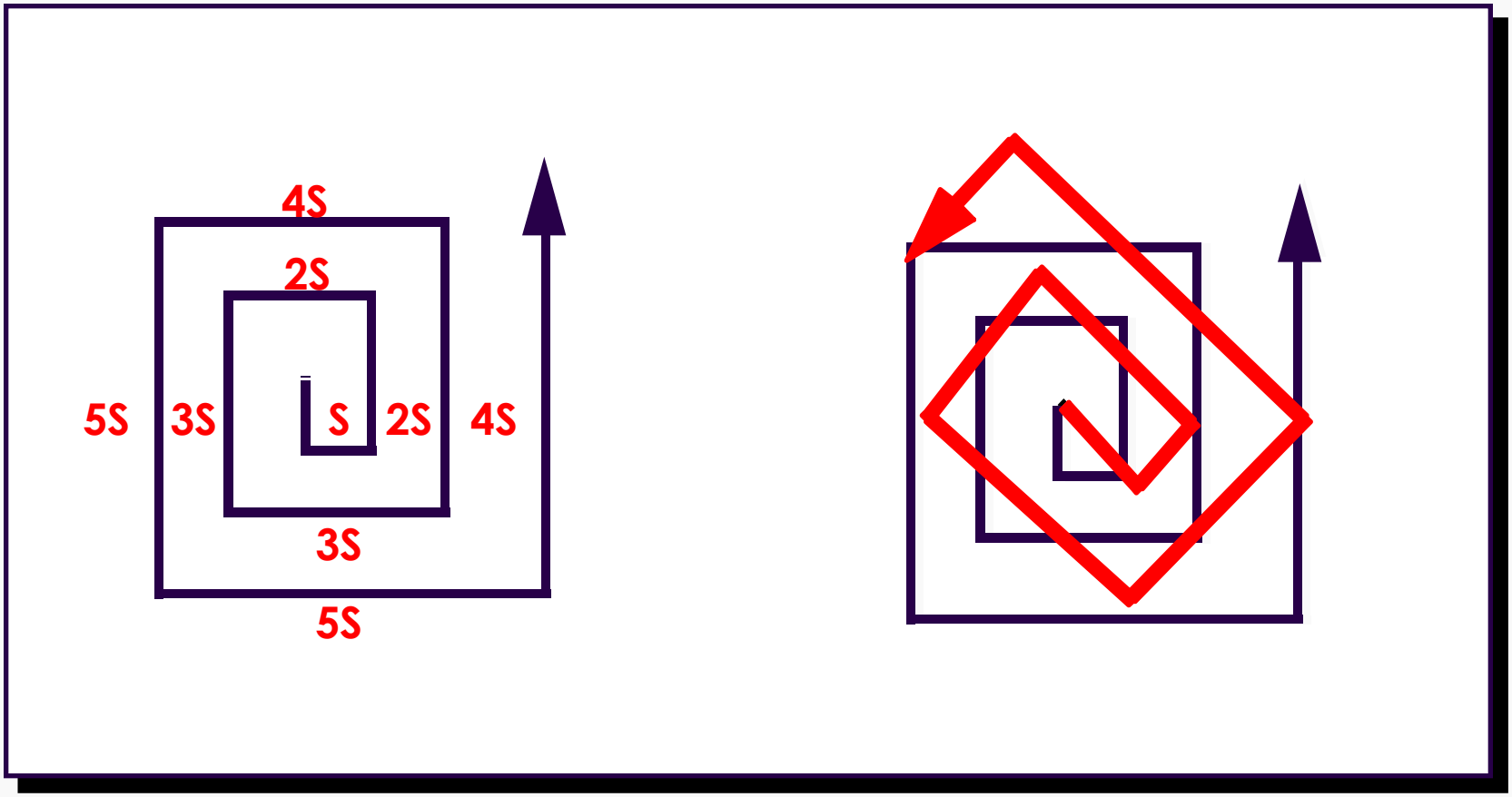
	IDENTIFIER	FREQUENCY	RADIAL
1.	OOM	110.2	240°

Expanding Square search pattern
(second pass rotated 45°)



Searching for a missing ultra-light:

- Draw the route on the worksheet
- Center is a 483 AGL tower approximately 8 nm west of Seymour
- Use cardinal headings, starting to the north

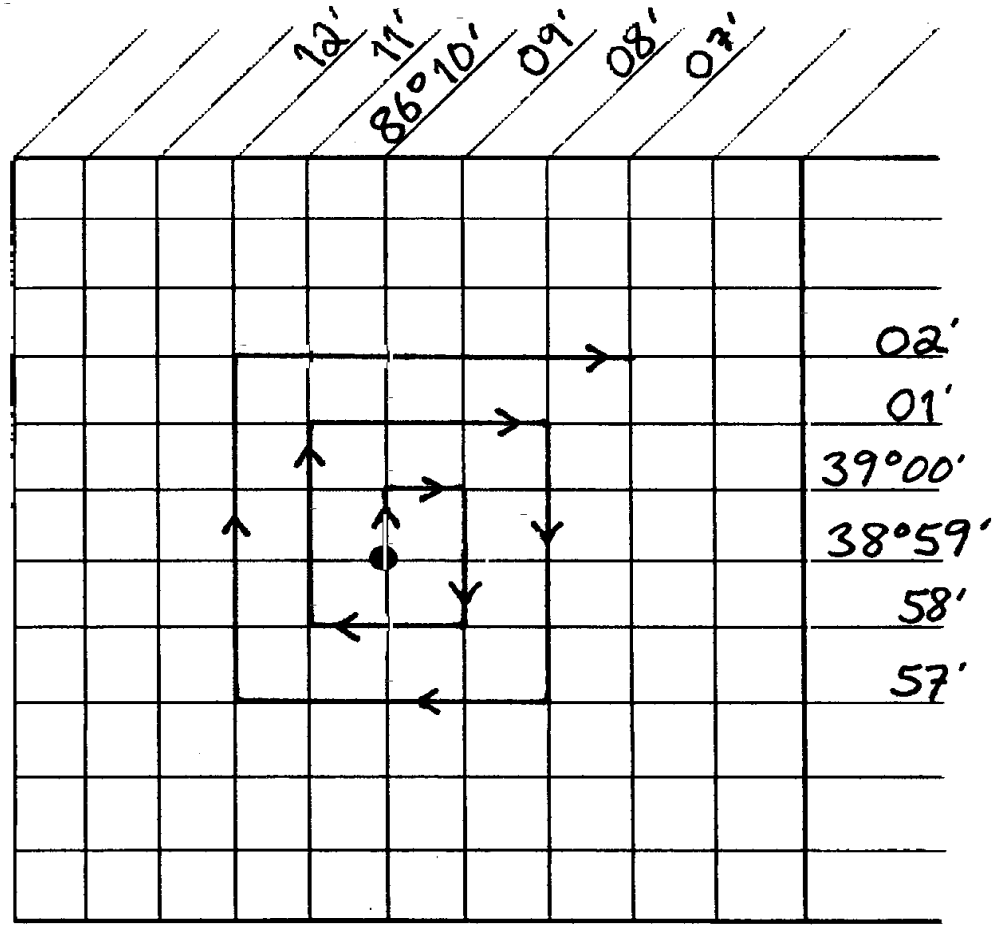
- **GX55 Data**
- **Type Grid & Sectional:** US , STL
- **Pattern:** Expanding Square
- **Starting Waypoint:** N 38° 59´ W 86° 10´
- **Spacing:** 1 nm
- **Direction of Travel:** 000°

Expanding Square Coordinates

SECTIONAL: STL (N) S GRID # 132 A B C D

ENTRY POINT: N 38°59′ W 86°10′

EXIT POINT: N 39°02′ W 86°07′



NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	OOM	110.2	123°
2.	ABB	112.4	313°

Sector Search Pattern

The pattern and headings are planned in advance

Sector search is easier to fly than expanding square

This pattern is used when an electronic search has led the crew to a general area to find the exact location visually

The pattern provides concentrated coverage near the center of the area